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Application No.: 10/091,942

Docket No.: JCLA8556

OFFICIAL

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:)
Jing-Horng Gan)
Anchor Chen) Examiner : WARREN, MATTHEW E
Serial No. : 10/091,942) Art Unit : 2815
Filed : 03/05/2002) Docket No. : JCLA8556
For : VARIABLE CAPACTOR)
STRUCTURE AND METHOD OF)
MANUFACTURE)

No fee is believed to be due. However, the Commissioner is authorized to charge any fees required in connection with the filing of this paper to account No. 50-0710 (Order No.: JCLA8556)

AMENDMENT AND RESPONSE TO OFFICE ACTION

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

*Okay to
Enter
new
8/30/04*

Dear Sir:

The Office Action mailed May 20, 2004 has been carefully considered. In response thereto, please enter the following amendments and consider the following remarks.

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In The Claims:

Claim 1 (currently amended) A variable capacitor structure, comprising:

a substrate;

a first type ion-doped well within the substrate, wherein the first type ion-doped well has a cavity;

a first-type ion-doped buried layer in the substrate underneath the first type ion-doped well, wherein the first type ion-doped buried layer and the first type ion-doped well are connected;

a second type ion-doped region at the bottom of the cavity of the first type ion-doped well; and

a conductive layer including a contact over the first type ion-doped buried layer, wherein the conductive layer and the first type ion-doped buried layer are connected;

wherein the second type ion-doped region and the conductive layer are located within the same active device region of the substrate, and the conductive layer is isolated from the second type ion-doped region through an insulation layer.

Claim 2 (original) The variable capacitor of claim 1, wherein the structure further includes a first metal silicide layer over the second type ion-doped region.

Claim 3 (original) The variable capacitor of claim 1, wherein the conductive layer further includes a second type ion-doped deep collector region.

Claim 4 (original) The variable capacitor of claim 3, wherein the structure further includes a second metal silicide layer over the second type ion-doped deep collector region.

Claims 5-6 (canceled)

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Claim 7 (original) The variable capacitor of claim 1, wherein the structure further includes a second metal silicide layer between the first type ion-doped buried layer and the conductive layer.

Claim 8 (original) The variable capacitor of claim 1, wherein the structure further includes an isolation structure within the first type ion-doped well between the second type ion-doped region and the conductive layer.

Claim 9 (canceled)

Claim 10 (original) A variable capacitor structure, comprising:

a substrate;

a first type ion-doped well within the substrate, wherein the first type ion-doped region has a shallow trench isolation structure;

a first type ion-doped buried layer in the substrate underneath the first type ion-doped well, wherein the first type ion-doped buried layer and the first type ion-doped well are connected;

at least one second type ion-doped region in the first type ion-doped well at the bottom of the shallow trench isolation structure; and

at least one first conductive layer connected to the first type ion-doped buried layer.

Claim 11 (original) The variable capacitor of claim 10, wherein the first type ion-doped buried layer is an N-type buried layer and the second type ion-doped region is a P-doped region.

Claim 12 (original) The variable capacitor of claim 10, wherein the structure further includes at least a second conductive layer connected with the second type ion-doped region.

Claim 13 (original) The variable capacitor of claim 10, wherein the structure further includes a metal silicide layer between the first type ion-doped buried layer and the first conductive layer.

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Claim-14 28 (currently amended) The variable capacitor of claim-5 1, wherein the contact is isolated from the second type ion-doped region through an insulation layer.

Claim-15 29 (currently amended) The variable capacitor of claim-14 28, wherein the first-type ion-doped buried layer has a second cavity and the conductive layer is over the second cavity of the first-type ion-doped buried layer.

Claim-16 30 (currently amended) The variable capacitor of claim-15 29, wherein the structure further includes a second metal silicide layer on a surface of the second cavity of the first-type ion-doped buried layer and between the first type ion-doped buried layer and the conductive layer.

Claim 31 (new) A variable capacitor structure, comprising:

a substrate;

a first type ion-doped well within the substrate, wherein the first type ion-doped well has a cavity;

a first-type ion-doped buried layer in the substrate underneath the first type ion-doped well, wherein the first type ion-doped buried layer and the first type ion-doped well are connected;

a second type ion-doped region at the bottom of the cavity of the first type ion-doped well;
and

a conductive layer including a contact over the first type ion-doped buried layer, wherein the conductive layer and the first type ion-doped buried layer are connected;

wherein the contact is isolated from the second type ion-doped region through an insulation layer, the first-type ion-doped buried layer has a second cavity and the conductive layer is over the second cavity of the first-type ion-doped buried layer.